



WILLIAM CRAWFORD GORGAS
1854-1920

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GENERAL WILLIAM CRAWFORD GORGAS, M.D., D.Sc.

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It is but a few years since there passed from us in London, just at the start of his last mission to combat yellow fever in West Africa, General William Gorgas, "America's Ambassador of Mercy," as he has been aptly called, "the benefactor of humanity and the redeemer of the tropical world."

There are few stories of the miracles of old as wonderful as the tale of Gorgas's work in the Panama Canal Zone. That equatorial region, for centuries the greatest plague spot in the world, described by Sir Patrick Manson as one of the great tropical disease centres, a place where germs may flourish all the year round because there is no cold season to destroy them, was transformed by Gorgas in the twinkling of an eye into a healthy, habitable region. Within a year of his coming, he rid the place of yellow fever and reduced a death-rate of from 40 or 60 per thousand to one of 7 per thousand. It was little wonder the inhabitants looked upon him as the saviour of mankind. But to realise fully what he accomplished, we must have some idea of the conditions that existed before his advent. At the laying of the foundation stone of the Gorgas Memorial Institute of Preventive Medicine in Delaware, Dr Porras, a former President of the Republic of Panama,

recalled the early days of his youth. He said: "I can still remember, and it seems to me a horrible nightmare when, on my way to Bogota to finish my studies, I found it necessary to spend a night in Colon. Sleep during that night was impossible for me because of the constant and tormenting bites of the mosquitoes . . . tormentors so numerous that by clutching at the apparently empty air, I caught handful after handful. . . . In those days of long ago it was the most natural thing for one to promenade the city's thoroughfares holding a handkerchief to one's nostrils to keep out or lessen the stench contaminating the air as a result of the decaying vegetation. On every hand one encountered well-beloved friends hastening home in the grip of malarial chills or some equally pernicious fever. . . . Those days have passed never to return, and our tropical home has become one of the world's health resorts."

William Crawford Gorgas was born in Mobile, Alabama, on the 3rd of October 1854, and his name implies a Spanish origin. He was the son of General Josiah Gorgas who, during the Civil War, was in Command of the Ordnance of the Southern Confederacy, and later was President of the University of the South, at Sewanee in Tennessee. His mother was the daughter of Governor Gayle of Alabama. He was brought up in Richmond, Virginia, until the Civil War ended, when he was nine years old. As a boy Gorgas wanted to be a soldier, but the idea was not encouraged by his parents who had seen so much of war and, after graduating B.A. at the University of the South in 1875, he decided to study medicine and entered the Bellevue Hospital Medical College in New York. Even in his student days the gaunt

spectre of yellow fever, the dreaded scourge, considered then a most contagious disease, dogged his footsteps. While he was at College, an outbreak occurred at Memphis, and Gorgas, along with other fellow students, volunteered his services to attend the sick, but the authorities refused him permission to go. He had to wait a little while longer. In 1879 he graduated M.D. and, still bent on a military career, he entered the Medical Department of the United States Army. As 1st Lieutenant, he was stationed at Fort Brown, Texas, in 1880, when close-by, in Brownsville, a violent epidemic of yellow fever broke out, and spread with such alarming rapidity that appeals were made to the Government for help. The place was beyond Gorgas's sphere of work, but he immediately offered his services and was sent into the fever-stricken district. Here, among others, he attended Miss Doughty of Cincinnati, a visitor to Fort Brown, who had caught the infection. Her condition was so serious that all hope of her recovery had been abandoned, and it is said that her very grave was dug, but the unexpected happened; she pulled through and lived to marry Gorgas in 1885, when he was promoted to the rank of Captain. In the meantime, he himself contracted the disease, a fact, since he recovered, not without its advantages, for it rendered him immune for the future and enabled him to serve without peril in the yellow fever regions of the tropics.

Gorgas saw active service in Florida and in the Dakotas, and in 1898, when the Spanish War broke out, he was promoted to the rank of Major and Brigade Surgeon of Volunteers, and accompanied the military expedition against Santiago. When the

war was over, before the end of the year 1898, he was appointed Chief Sanitary Officer in Havana, a post which he occupied until 1902. During his service in Cuba the United States Government sent the Walter Reed Commission to Havana to investigate the cause of yellow fever, for Havana had not been free of this scourge for 150 years, and, although in 1881 Carlos Finlay had arraigned the mosquito as the carrier of this disease, his brilliant work had had to wait twenty years for corroboration. When Walter Reed's discovery was announced and the mosquito of the genus *Stegomyia fasciata* was convicted of being the carrier of infection from one case to another, Gorgas said to the general in command: "If that is the cause of yellow fever, and I believe it is, as I have worked with the Commission, if you will give me authority to do what should be done, I will eliminate it from Havana." The General replied, "Go to it." And in February 1901, Gorgas began the stupendous task of exterminating the mosquito from Havana. Remembering President Porras's description of how it was only necessary to stretch out a hand to close it on a fistful of these insects, we can well imagine that it was no simple task with which he was confronted. The order went out that every case, or suspected case, of yellow fever was to be screened with wire gauze, so that the room was made mosquito-proof, and all the mosquitoes in the house and in the neighbouring houses were destroyed. The eggs of the mosquito are laid in stagnant water, in puddles or any convenient receptacle that may be found round about the dwelling places of man. It is therefore not a difficult matter to destroy the larvæ, for oil scattered on the face of the water is sufficient to

kill them. By the middle of February, Gorgas had a hundred men employed in the work of destruction, clearing out every breeding place. Up to June, strict quarantine of patients was enforced, their houses and bedding being disinfected, but after June the quarantine was somewhat relaxed. The patient's case had to be reported, his house screened and a warning notice displayed outside. A guard, whose duty it was to report whether all sanitary regulations were strictly carried out, was attached to each case. These measures were paid for from the public purse. By September the disease had been eradicated, and Havana, for the first time in a century and a half, was free of yellow fever.

A table of deaths in Havana over a period of thirty-four years, illustrates beyond the shadow of a doubt the value of Gorgas's work. From 1873 to 1879 there were well over a thousand deaths in each year, 1876 having the high record of 1619. In other years the record varies from 300 to 800 with the exception of 1899, which had the low record of 103. In 1900 there were 310 deaths, but in 1901, during the second month of which Gorgas's preventive work began, there were eighteen deaths from yellow fever; and in 1902, 1903 and 1904, when the record ends, there were none. In recognition of this work in eliminating the disease from Havana, Gorgas was promoted to the rank of Colonel by special Act of Congress and was made Assistant Surgeon-General of the United States Army.

In 1904 he was appointed Chief Sanitary Officer of the Panama Canal Zone, an appointment which he held till 1907, when he was made a member of the Isthmian Canal Commission. For four hundred

years yellow fever had carried off by the thousand succeeding generations of men in the Isthmus of Panama. All attempts to construct the canal had been frustrated by this scourge. When the French under de Lesseps began their building operations in 1880, they lost by death during the nine years of their occupation which ended in the bankruptcy of the Company in 1889, 22,189 labourers, and in 1904 when the United States took charge of the Canal, a yellow fever epidemic was sweeping away the inhabitants by the thousand. Then Gorgas took command, and in one year's time yellow fever and malaria were wiped out from the Isthmus. Mr Wellcome, the founder of the Tropical Research Laboratories at Khartoum, paid a tribute to Gorgas's work in the evidence that he gave before the United States Committee for Foreign Affairs in January 1928. He had visited Panama at the request of the American Secretary of War in 1910 to report on the sanitary work. "I have never seen anything anywhere," he said, "that equalled the perfection of organisation, systematising and direction that I found under the administration of General Gorgas. Gorgas had gathered about him a wonderful staff." He went on to describe how he was taken "long cruises through the reeking Panama swamps" to see at first hand the difficulties which had to be overcome. "One of the various serious problems which have baffled many workers in the humid Tropics has been how effectually to destroy and keep under control the rank plant life that springs up in a night with overwhelming rapidity at the water's edge and in marshy places, forming cup-like receptacles that are filled by the rain and make abundant breeding

places for mosquitoes." The Panama Sanitary Staff succeeded in checking this growth by means of a powerful blast of burning petrol sprayed on to the roots of the undergrowth, and they scattered sand over the cup-like holes made by crabs on the sea-shore, for mosquitoes, contrary to traditional belief, can breed in salt water. Such was the perfection of organisation attained by Gorgas that his preventive measures were carried out at the small cost of one cent a day per man. From fifty to sixty thousand men were employed in the Canal Zone, and malaria was practically stamped out among them. "A finer piece of economic health control would seem to be impossible," said Mr Wellcome. Even the railway trains that crossed the Isthmus were searched by Gorgas's inspectors in "every nook and corner," not for taxable goods, but for straggling mosquitoes, with such precision and thoroughness was every detail carried out. The success that attended these efforts altered the face of the Western tropics for the white man. Mr Wellcome recalled how Stanley, in the face of the deadly fevers that attended his rescue of Livingstone, had at one time been convinced that the white man could not cope with malaria and the other diseases of equatorial Africa; but how, at his last public appearance, at a dinner given to Dr Andrew Balfour, now Sir Andrew Balfour, on his appointment to the Directorship of the Wellcome Tropical Research Laboratories in Khartoum, he admitted that, thanks to the work of the London and Liverpool Schools of Tropical Medicine, the deadly plagues that harassed mankind were being conquered.

The Liverpool School of Tropical Medicine recognised Gorgas's work in the Panama Canal

Zone by the award of the Mary Kingsley Medal in 1907, and he received the honorary degrees of the Universities of Pennsylvania, the South, Harvard, Johns Hopkins and others, and was elected President of the American Medical Association in 1909-10. He remained in Panama, serving on the Isthmian Canal Commission until the winter of 1913 when, at the invitation of the Chamber of Mines in Johannesburg, he went to South Africa to investigate the cause of the high death-rate from pneumonia among the native miners in the Rand, and by the improvements he effected there the death-rate was considerably reduced.

In 1914 Oxford University conferred upon him the honorary degree of D.Sc., and the American Museum of Safety awarded him its Gold Medal. In 1915 he and his fellow-workers received a vote of thanks from Congress for their services in connection with the construction of the Panama Canal. Without these services the construction of the Canal could never have been accomplished, and it is well that Congress recorded the States' indebtedness, for governments have been slow to recognise the invaluable work of Health Officers.

Promoted to the rank of Surgeon-General of the United States Army in 1914, Gorgas was again promoted in the following year, being made Major-General. In 1916 he spent three months in the tropics of South America at the head of a Yellow Fever Commission sent out by the Rockefeller Foundation, making surveys and plans for preventive measures. The year 1917 saw the entry of the United States into the War, and Gorgas was responsible for the organisation of the Medical Corps

of the United States Army. Before the War ended, he had 32,000 men in his medical corps, and a personnel, including nurses, amounting to very nearly 200,000. In order that the United States should have an Army composed of men of first-class physique, Gorgas proposed that the recruits should be examined by a Board of experts to include a dentist, oculist, aurist, pathologist, surgeon and physician. The expense of providing such a Board in every town of the United States was enormous. Nevertheless, it was done, and the health of the troops that crossed the Atlantic bore witness to the efficiency of the method. The residue left behind were to Gorgas but a fresh incentive to wage the war of preventive medicine, for out of 7,000,000 men examined only 4,500,000 were passed fit, which meant that one-third of the men of military age were found to be unfit. He had visions of a future when Sanitary Science by prevention of disease shall have routed the unfit from the United States of America.

During this period Dr Arthur M'Cormack, President of the Kentucky Board of Health, was sent by Gorgas to take charge of the work at Panama. In the evidence he gave before the Committee of Foreign Affairs on the Gorgas Memorial Laboratory, he described an incident which well illustrates the care that Gorgas bestowed upon every detail of his work. "Upon arriving at Panama, I familiarised myself as far as practicable, with administrative procedure, and with what happened, for example, when a man telephoned to the sanitary inspector of his district that a mosquito had been found in his residence. . . . Soon afterwards I was fortunate enough to find a couple of mosquitoes in my house.

I telephoned down to the sanitary inspector. . . . In a few minutes a truck came up with the sanitary inspector and four or five labourers in it; and they spread themselves through that house looking for mosquitoes. And they knew just where to look. With their flashlights casting their beams behind everything that cast a shadow, they went everywhere. And in a very short time they found these two mosquitoes . . . caught them in a test-tube, with a little chloroform cotton in it, and, with a magnifying glass, soon found what kind of mosquito each was. They would then know whether it had bred in the house or whether it had come into the house from outside. This happened to be a kind of mosquito that flew against the wind, and always bred in shallow wet places on the ground. That meant that there was such a place somewhere near my house. . . ." But they did not stop there. The sanitary inspector fetched a map of the neighbourhood and, knowing that these mosquitoes flew against the wind, and knowing the direction of the wind for the few preceding days, he knew that they had come from a certain direction. So search was made in that direction, and on the following day a leak in a water-pipe revealed the place where the mosquito had bred. "We can understand very readily," said Dr M'Cormack, "from the perfection of that organisation, why the death-rate of Panama is half that of the ten best rates in the United States; and the rate of sickness in Panama is about one twenty-fifth of that in this country."

In 1918, having reached the age-limit of sixty-five, Gorgas retired from the United States Army, and immediately undertook the direction of the Yellow

Fever work under the International Health Board of the Rockefeller Foundation. He received the Distinguished Service Medal of the United States, and was made Commander of the Legion of Honour of France. At the urgent request of the British Government he arrived in London on the 7th of May 1920 on his way to West Africa to serve on a Yellow Fever Commission. The introduction of preventive measures in a civilised community which understands the aims of the regulations imposed is a simple matter compared with the difficulties that meet the administrator in countries where a large native population is not under efficient control, and, had fate permitted, it would have been interesting to see the results of Gorgas's genius for organisation on such a land as the West Coast of Africa. But Gorgas never reached Africa. From London he went to Brussels, where he was decorated by King Albert, and then he made a tour of Belgium and the Rhine districts round Coblenz. Returning to London, he was struck down by a cerebral hæmorrhage on the 30th of May, and was taken critically ill to Millbank Hospital. It had been arranged that he should visit the King at Buckingham Palace to receive the Order of St Michael and St George in recognition of his great work for humanity and his services to the British Forces during the War. Instead, the King, departing from the usual etiquette of Court, went to Millbank to see Gorgas and personally bestowed upon him the Order, talking with him about his work. Gorgas did not rally and, to the profound sorrow of the British people, he died on the 4th of July 1920. By the King's command a State funeral was given him with full military honours

in St Paul's Cathedral, and thousands of citizens thronged the streets to pay a last tribute to America's great dead. A British man-of-war conveyed his body to his own land, where he was buried among the famous departed of the great American nation.

As Gorgas was not a man who would have cared for a monument in bronze or marble, it was proposed by his fellow-workers that a research laboratory should be established in his memory on the Isthmus of Panama, where with the constant traffic of ships, every tropical disease presents itself. A Bill for the establishment of this laboratory passed the House of Representatives and the Senate in April 1928, and on May the 7th it received the President's approval and became law. There will thus arise in the place where his greatest work was done, a fitting memorial for a man of science.

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